MAY 2025 **U/ID 32503/URM1A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. Define Gauss – elimination method.

2. Write the general formula for computing $a'_{ij}s$ in Crout's method.

3. Prove that $\Delta = E - 1$.

4. What is unit operator?

5. Find $\Delta(x \sin x)$.

6. State Error interpolation formula.

7. What is meant by interpolation polynomials?

8. Why do we use Newton's backward interpolation formula?

9. Find the parabola of the form $y = ax^2 + bx + c$ passing through the points (0, 0), (1, 1) and (2, 20).

10. From the following table find y at $x = 2$.

x:	0	1	3	4
y:	5	0	50	105

11. State two types of inverse interpolation method.

12. Prove the following table find the value of x at $y = 30000$

x	10	15	20
y	1754	2648	3564

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Use Gauss – Jordan method to solve $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$.

14. By Crout's method obtain the solution of the system of equation $x + 3y + 8z = 4$, $x + 4y + 3z = -2$ $x + 3y + 4z = 1$.

15. Evaluate $\Delta[x(x+1)(x+2)(x+3)]$.

16. Express $x^4 + 3x^3 - 5x^2 + 6x - 7$ in factorial polynomial and get their successive forward difference taking $h = 1$.

17. The population in a town as follows

Year x:	1941	1951	1961	1971	1981	1991
Population in y lakhs:	20	24	29	36	46	51

Estimate the population increase during the period 1946 to 1976.

18. From the following table, obtain $\frac{d^2y}{dx^2}$ at $x = 0.96$

x:	0.96	0.98	1.00	1.02	1.04
y:	0.7825	0.7739	0.7651	0.7563	0.7473

19. Obtain the value of when $A = 85$ from the following table using Lagrange's method.

t	2	5	8	14
A	94.8	87.9	81.3	68.7

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Using Gauss-Seidal method, solve the equations $8x - y + z - 18 = 0$, $2x + 5y - 2z - 3 = 0$, $x + y - 3z + 6 = 0$.

21. Find $f(x)$ from the table below. Also find $f(7)$.

x:	0	1	2	3	4	5	6
f(x):	–1	3	19	53	111	199	323

22. From the following data find θ at $x = 43$ and $x = 84$

x:	40	50	60	70	80	90
θ:	184	204	226	250	276	304

Also express θ interms of x.

23. Find the first, second and third derivative of the function tabulated below at $x = 1.5$.

x:	1.5	2.0	2.5	3.0	3.5	4.0
f(x):	3.375	7.0	13.625	24.0	38.875	59.0

24. Interpolate y at $x = 5$.

x:	1	2	3	4	7
y:	2	4	8	16	128